



**UNITED STATES DEPARTMENT OF COMMERCE**  
**Patent and Trademark Office**

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
09/352,194	07/13/99	YAMAZAKI	S 0756-1998

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MMC1/0928

EXAMINER

TOLEDO, F

ART UNIT

PAPER NUMBER

2823

DATE MAILED: 09/28/00

**Please find below and/or attached an Office communication concerning this application or proceeding.**

**Commissioner of Patents and Trademarks**

# Office Action Summary

Application No.

09/352,194

Applicant(s)

YAMAZAKI ET AL.

Examiner

Fernando Toledo

Art Unit

2823

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).

## Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-23 is/are pending in the application.
- 4a) Of the above claim(s) 1-4 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 5-23 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claims \_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 07/13/99 is/are objected to by the Examiner.
- 11) ☐ The proposed drawing correction filed on \_\_\_\_ is: a) ☐ approved b) ☐ disapproved.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. § 119

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).
- a) ☒ All b) ☐ Some \* c) ☐ None of the CERTIFIED copies of the priority documents have been:
1. ☒ received.
2. ☐ received in Application No. (Series Code / Serial Number) \_\_\_\_.
3. ☐ received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

- 14) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. & 119(e).

## Attachment(s)

- 15) ☒ Notice of References Cited (PTO-892)
- 16) ☒ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 17) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 5 & 6.
- 18) ☐ Interview Summary (PTO-413) Paper No(s) \_\_\_\_.
- 19) ☐ Notice of Informal Patent Application (PTO-152)
- 20) ☐ Other:

## DETAILED ACTION

### *Election/Restrictions*

1. Claims 1 – 4 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention, there being no allowable generic or linking claim. Election was made **without** traverse in Paper No. 8.
2. Applicant's election without traverse of invention II, claims 15 - 18 in Paper No. 8 is acknowledged.

### *Drawings*

3. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference sign(s) not mentioned in the description: under film 102. Correction is required.
4. The drawings are objected to under 37 CFR 1.83(a) because they fail to show quartz substrate 301 in Figure 3 and source region 405 in figure 4A, as described in the specification. Any structural detail that is essential for a proper understanding of the disclosed invention should be shown in the drawing. MPEP § 608.02(d). Correction is required.
5. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(4) because reference characters "804" and "1204" have both been used to designate tangential line in figure 9B, reference character "402" in figure 4A refers to p-channel TFT 405 in page 33 lines 13 and 14 and reference characters "308" and "408" have both been used to designate drain wiring. Correction is required.

### *Specification*

6. The disclosure is objected to because of the following informalities: change, in page 28 line 17 "Hbr" to --HBr-- and in page 33 line 1 "13" to -- IIIA--.

Appropriate correction is required.

### ***Claim Objections***

7. Claim 13 is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. Claim 13 limitation states a temperature range of a second annealing treatment, however this limitation is already incorporated on the parent claim 12.
8. Claims 12 and 14 are objected to under 37 CFR 1.75 as being a substantial duplicate of claims 5 and 6. When two claims in an application are duplicates or else are so close in content that they both cover the same thing, despite a slight difference in wording, it is proper after allowing one claim to object to the other as being a substantial duplicate of the allowed claim. See MPEP § 706.03(k)
9. Claims 15 – 18 are objected to under 37 CFR 1.75 as being a substantial duplicate of claims 8 – 11. When two claims in an application are duplicates or else are so close in content that they both cover the same thing, despite a slight difference in wording, it is proper after allowing one claim to object to the other as being a substantial duplicate of the allowed claim. See MPEP § 706.03(k).

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

10. Claims 5, 6, 8 – 10, 12 – 17, 19 – 22 are rejected under 35 U.S.C. 102(b) as being anticipated by Takemura US patent 5,616,506.

In re claims 5, 8, 12, 15, 19, 21 and 22, Takemura in US patent 5,616,506 figures 1A – 7E and related text, adds a catalytic element (e.g. nickel film 105) for facilitating crystallization of an amorphous semiconductor thin film (column 6 lines 31- 36).

Takemura also teaches a first heat treatment to transform the amorphous semiconductor into crystalline semiconductor. (column 6 lines 37 – 47). Takemura discloses a second heat treatment in a reducing atmosphere that contains hydrogen (column 7 line 5).

In re claims 5, 9, 12, 13 and 16, the second heating treatment is carried out in a temperature range from 900°C – 1200°C (column 7 lines 6 – 9).

In re claims 6, 10, 14 and 17, the second heating treatment is performed in a closed compartment, which is a furnace (column 7 lines 9 – 15).

In re claims 8 and 12, Takemura discloses including a halogen element (column 7 line 5).

In re claims 19 – 22, Takemura teaches doping the semiconductor, with the nickel still in it, with phosphorous (column 7 lines 41 – 45). Takemura also teaches that the semiconductor is patterned and then it is heat-treated again (column 7 lines 41 –

65). It is inherent that since the nickel is still in the semiconductor film when the phosphorous is added and then heat-treated, it will be gettered.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections, set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

11. Claims 7, 11, 18 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takemura in view of Zhang et al. (US patent 5,888,857) in further view of Dorin et al.

In re claims 7, 11 and 18, Takemura teaches all the limitations of claim 5 and 8 as recited above.

Takemura lacks anticipation on the annealing preformed in an atmosphere void of oxygen or oxides.

However, Zhang et al. in US patent 5,888,857 in figures 1A – 11D and related text, teaches that the annealing process can be done in an environment void of oxygen. This is done to prevent the silicon from reacting with the oxygen thereby preventing the formation of a silicon oxide film, which prevents crystallization of the amorphous silicon film (column 7, lines 59 – 67 and column 8, lines 1 – 25).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to anneal the silicon wafer in an environment void of oxygen to further the crystalline growth of amorphous silicon.

In re to claim 23, Takemura teaches adding a catalytic element for facilitating crystallization growth of an amorphous semiconductor film (column 6 lines 31- 36).

Takemura also teaches the heat treatments, the introduction of phosphorous in a source and drain region, carrying out a second heat treatment in a temp range of 900 – 1200°C (column 6 and column 7).

However Takemura lacks anticipation of an ammonia atmosphere during the annealing process of the second heat treatment.

Zhang et al. in US patent 5,888,857, discloses that the annealing for crystallization can be done in an atmosphere of hydrogen and nitrogen without oxygen.

However Takemura in view of Zhang still lacks anticipation of ammonia in the atmosphere.

However, it is well known in the art, as taught by Dorin et al., page 532, that an atmosphere containing nitrogen and hydrogen at high temperatures will produce ammonia. Therefore it would have been obvious to one of ordinary skill in the art to at the time the invention was made to use Zhang et al. process with Takemura to anneal a semiconductor film in an atmosphere void of oxygen and use hydrogen and nitrogen as in Zhang, which forms ammonia in high temperatures, since it furthers crystallizes growth of an amorphous silicon film. It would also have been obvious to one having ordinary skill in the art at the time the invention was made to use ammonia, as the annealing environment on the second annealing of Takemura as taught in Zhang, since it has been held to be within the general skill of the worker in the art to select a known material on the basis of suitability for its intended use involves ordinary skill in the art.

In re Leshin, 125 USPQ 416.

**Conclusion**

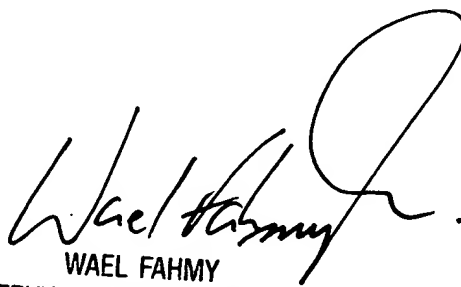
12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Fernando Toledo whose telephone number is (703)-305-0567.

13. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wael Fahmy can be reached on (703) 308-4918. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-4918.

14. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

Fernando Toledo  
Patent Examiner  
Art Unit 2823

ft  
September 27, 2000

  
WAEL FAHMY  
SUPERVISORY PATENT EXAMINER  
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